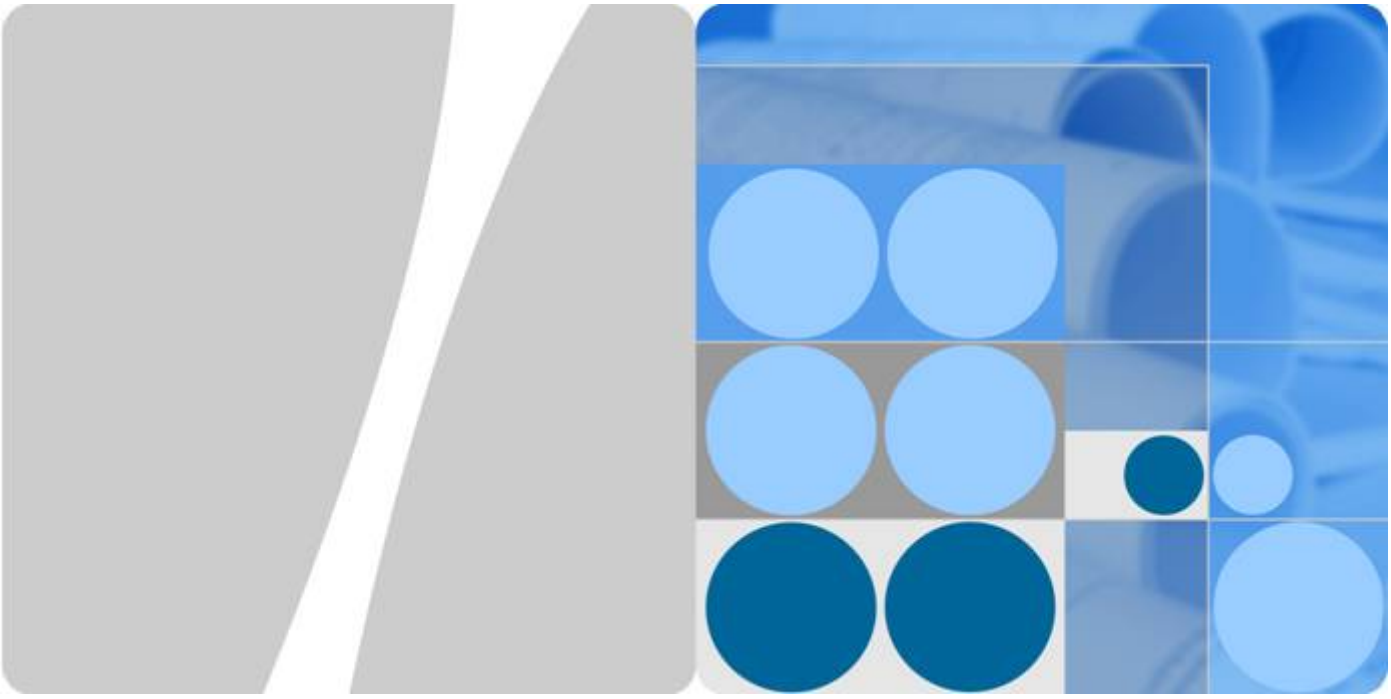


Huawei FusionServer 1288H V5

White Paper

Issue 03

Date 2017-11-30

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://e.huawei.com

About This Document

Purpose

This document describes the 1288H V5 in terms of its appearance, performance parameters, and component compatibility to help users has a profound understanding of the 1288H V5.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
NOTE	Calls attention to important information, best practices, and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 03 (2017-11-30)

This issue is the third official release.

Mode	Change Description
New	Added the GPU card and Broadcom SAS3508 RAID controller card specifications.

Issue 02 (2017-08-18)

This issue is the second official release.

Mode	Change Description
New	Added a note about the condition for supporting the maximum resolution of the video card integrated into the mainboard.

Issue 01 (2017-08-07)

This issue is the first official release.

Contents

1 Overview

The Huawei FusionServer 1288H V5 is a 1U 2-socket rack server developed for Internet, Internet data center (IDC), cloud computing, enterprise, and telecom service applications.

Marked H12H-05 on the nameplate, the 1288H V5 is ideal for IT core services, cloud computing virtualization, high-performance computing, distributed storage, big data processing, enterprise or telecom service applications, and other complex workloads. It combines low power consumption with high scalability and reliability, and easy deployment and management.

Figure 1-1 shows the appearance of a server with eight hard disks.

Figure 1-1 Appearance

2 Features

Performance and Scalability

The 1288H V5 offers the following features to boost performance and improve scalability:

- Intel® Xeon® Scalable processors ensure high processing performance by providing up to 28 cores, 3.6 GHz frequency, 38.5 MB L3 cache, and two 10.4 GT/s Ultra Path Interconnect (UPI) links between processors.
  - Each 1288H V5 supports two processors with 56 cores and 112 threads to maximize the concurrent execution of multithreaded applications.
  - Intel® Xeon® Scalable processors support L2 cache. Each core can exclusively use a maximum of 1 MB L2 cache or 1.375 MB L3 cache.
  - Intel® Turbo Boost Technology 2.0 enables processor cores to run at maximum speeds during peak hours by temporarily going beyond the processor thermal design power (TDP).
  - Intel® Hyper-Threading Technology enables each processor core to run up to two threads, improving parallel computation capability.
  - Intel® Virtualization Technology integrates hardware-level virtualization functions to allow OS vendors to better use hardware to address virtualization workloads.
- Twenty-four DDR4 error checking and correcting (ECC) RDIMMs or load-reduced DIMMs (LRDIMMs) provide a maximum memory speed of 2666 MT/s and a maximum memory capacity of 1,536 GB, featuring high speed and availability. The maximum memory bandwidth is 249.9375 GB/s in theory.
- The 1288H V5 supports flexible hard disk configurations and provides elastic and scalable memory capacities to satisfy storage capacity and upgrade requirements.
- The I/O performance of pure SSDs is higher than that of mixed configuration of SSDs and HDDs and 100 times that of pure HDDs.
- Intel® Advanced Vector Extensions 2.0 (AVX-512) improve floating-point computing performance for computing-intensive applications.
- The 1288H V5 supports various LAN on motherboard (LOM) and flexible NICs to provide rich network ports.
- The 1288H V5 supports up to three PCIe 3.0 slots.
- The Intel® Xeon® Scalable processors incorporate the PCIe 3.0 controller using the Intel Integrated I/O technology to shorten I/O latency and enhance overall system performance.

Availability and Serviceability

The 1288H V5 provides the following features to improve availability and serviceability:

- The 1288H V5 uses carrier-class components and follows the engineering process, which dramatically improves system reliability.
- The 1288H V5 uses hot-swappable SAS/SATA hard disks. It supports redundant array of independent disks (RAID) 0, 1, 1E, 10, 5, 50, 6, and 60 and offers RAID cache. A supercapacitor is used to protect RAID cache data from power failures.
- SSDs offer better reliability than HDDs, prolonging system uptime.
- The web user interface (WebUI) of the Intelligent Baseboard Management Controller (iBMC) and the UID and HLY LEDs and fault diagnosis LED on the panel help technical support personnel promptly obtain the status of key components and locate failed (or failing) components. This simplifies servicing, accelerates troubleshooting, and helps improve system availability.
- The iBMC monitors system parameters in real time, triggers alarms, and performs recovery actions in case of failures, minimizing system downtime.
- Huawei provides a three-year warranty for parts replacement and onsite repair for the servers used in China. Huawei provides a 10-hour-a-day, 5-day-a-week support program. Service requests will be handled the next business day. Optional service upgrades are available.
- Huawei provides a three-year warranty for parts replacement and repair for the servers used outside China. Huawei provides a 9-hour-a-day, 5-day-a-week NBD support program. Service requests will be handled the next business day. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

Manageability and Security

The 1288H V5 provides the following features to enhance manageability and security:

- The built-in iBMC module monitors server operating status and provides remote management.
- The Network Controller Sideband Interface (NC-SI) feature enables a network port to function as a management network port and a service port, which maximizes the return on investment (ROI) for customers. NC-SI is disabled by default. You can enable it on the iBMC WebUI or in the BIOS.
- The integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases setup, configuration, and update efficiency, and simplifies fault handling.
- The front bezel in the server chassis is locked to ensure local data security and reliability.
- The Intel® Advanced Encryption Standard–New Instructions (AES NI) support faster and stronger encryption.
- The Intel® Execute Disable Bit (EDB) function prevents certain types of malicious buffer overflow attacks when working with a supported OS.
- The Intel® Trusted Execution technology provides enhanced security by using hardware-based defense against malicious software attacks, allowing an application to run in an isolated space from all other applications running on the OS.

NOTE

The service network port supporting NC-SI has the following features:

- The service network port can be bound to a network port (host network port 1 by default) on a flexible or standard NIC.
- The service network port allows you to enable, disable, and configure a VLAN ID. A VLAN ID is disabled by default, and the default VLAN ID is 0.
- The service network port supports IPv4 and IPv6 addresses. You can set an IP address, subnet mask, default gateway, and IPv6 address prefix length for the service network port.

Energy Efficiency

The 1288H V5 offers the following features to save energy:

- The 1288H V5 supports 80 Plus Platinum power supply units (PSUs). The PSUs provide 94% power efficiency at 50% loads.
- The 1288H V5 supports active-standby power supplies and high-voltage DC (HVDC), improving power supply efficiency.
- Efficient VRD PSUs reduce the loss in DC/DC power conversion.
- The 1288H V5 supports area-based and intelligent fan speed adjustment, Proportional-Integral-Derivative (PID) speed adjustment, and intelligent processor frequency adjustment, reducing power consumption.
- The improved thermal design with energy-efficient fans ensures optimal heat dissipation and reduces system power consumption.
- The 1288H V5 supports power capping and power control.
- Hard disks are not powered on simultaneously, which reduces the server startup power consumption.
- The Intel® Intelligent Power Capability allows a single processor to be powered on or off based on site requirements.
- Low-voltage Intel® Xeon® Scalable processors consume less energy and apply to data centers and telecommunication environments that have power and thermal limitations.
- SSDs consume 80% less power than HDDs.

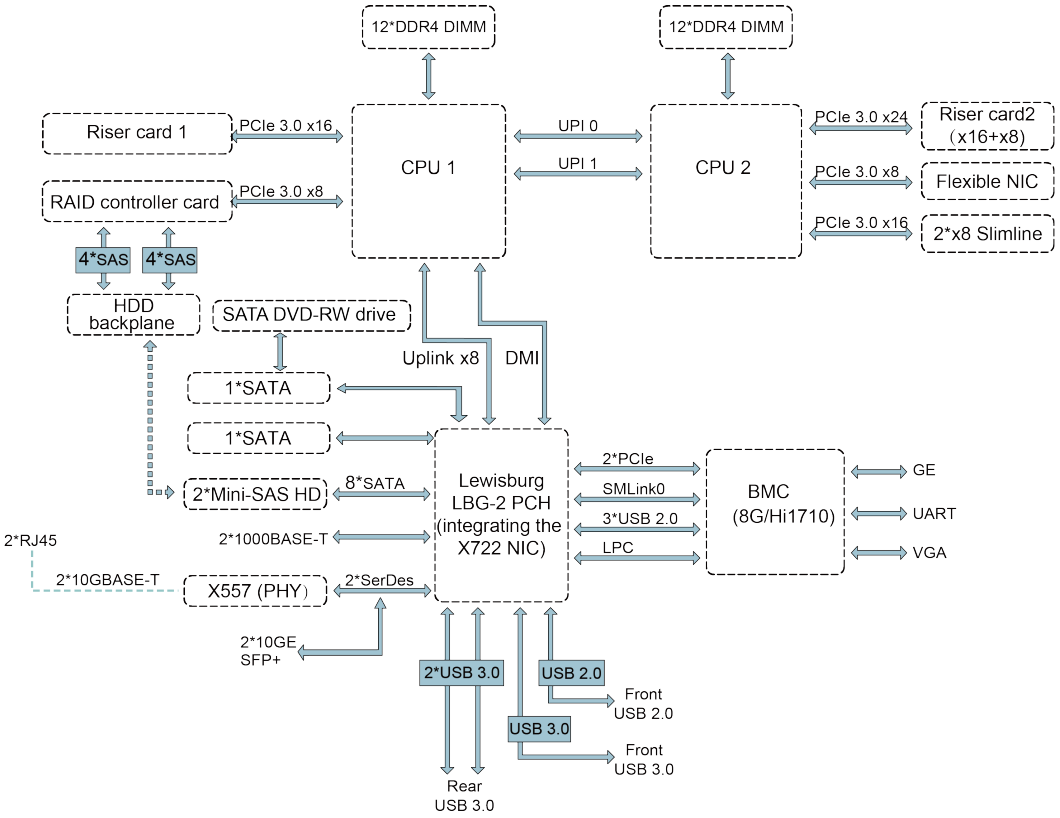
Customization

The 1288 V5 is a Huawei proprietary server. Huawei also provides customized development in a timely manner.

3 Logical Structure

Figure 3-1 shows the logical structure of the 1288H V5.

Figure 3-1 Logical structure of the 1288H V5



- The 1288H V5 supports two Intel® Xeon® Scalable CPUs and 24 DDR4 DIMMs. The CPUs interconnect with each other through two Ultra Path Interconnect (UPI) buses at speeds of up to 10.4 GT/s.
- The CPUs connect to two PCIe riser cards through PCIe buses and the riser cards provide various PCIe slots.
- The RAID controller card on the mainboard connects to CPU 1 through PCIe buses, and to the hard disk backplanes through SAS signal cables. The hard disk backplanes support various local storage configurations.

- The LBG-2 bridge chip provides two GE electrical LOM ports, and two 10GE optical LOM ports or two 10GE electrical LOM ports (through the X557 PHY).
- The Huawei Hi1710 management chip provides a VGA port, management network port, and debugging serial port.

4 Hardware Description

4.1 Appearance

Front Panel

- **Figure 4-1** shows the front panel of a server with four 3.5-inch hard disks.

Figure 4-1 Front panel of a server with four 3.5-inch hard disks

1	Hard disks	2	Label (including SN)

- **Figure 4-2** shows the front panel of a server with eight 2.5-inch hard disks.

Figure 4-2 Front panel of a server with eight 2.5-inch hard disks

1	Hard disks	2	Built-in DVD-RW drive (optional)
3	Label (including SN)	—	—

SN

The serial number (SN) on the label is a string that uniquely identifies a server. The SN is required when you contact Huawei technical support.

Figure 4-3 shows the SN format.

Figure 4-3 SN example

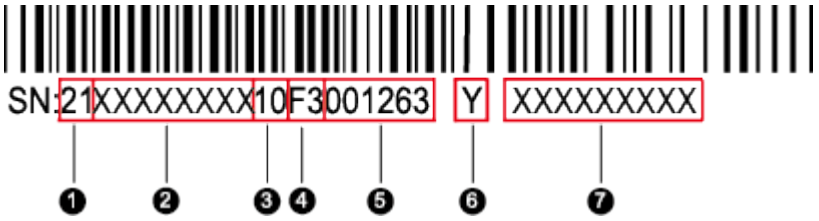


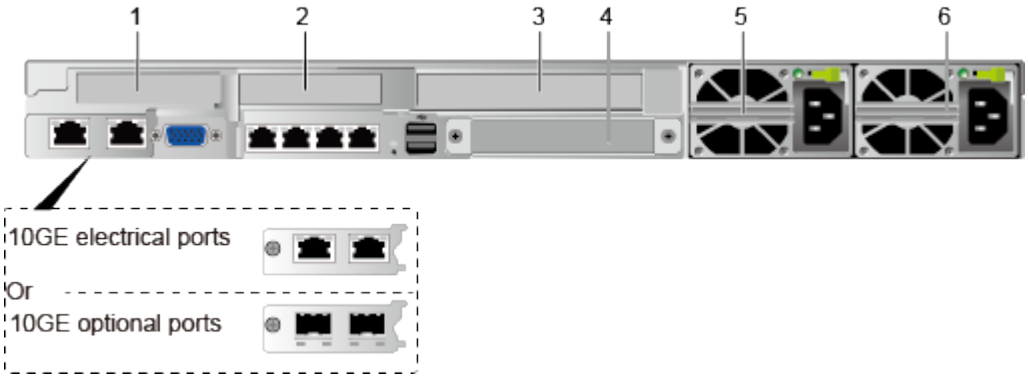
Table 4-1 SN description

No.	Description
1	Category code
2	Material identification code
3	Vendor code
4	Year and month The first character indicates the year. Digits 1 to 9 indicate 2001 to 2009, and letters A to Z indicate 2010 to 2035. The second character indicates the month. Digits 1 to 9 indicate January to September, and letters A to C indicate October to December.
5	Serial number
6	RoHS compliance
7	Internal model number of the board

Rear Panel

Figure 4-4 shows the rear panel of a server.

Figure 4-4 Rear panel



1	PCIe slot 1	2	PCIe slot 2
3	PCIe slot 3	4	Flexible NIC (optional)
5	PSU 1	6	PSU 2

4.2 Ports

Front Panel

- **Figure 4-5** shows the ports on the front panel of a server with four 3.5-inch hard disks.

Figure 4-5 Front panel of a server with four 3.5-inch hard disks

1	USB 2.0 port	2	USB 3.0 port
3	VGA port	—	—

- **Figure 4-6** shows the ports on the front panel of a server with eight 2.5-inch hard disks.

Figure 4-6 Front panel of a server with eight 2.5-inch hard disks

1	USB 2.0 port	2	USB 3.0 port
3	VGA port	—	—

Table 4-2 describes the ports on the front panel.

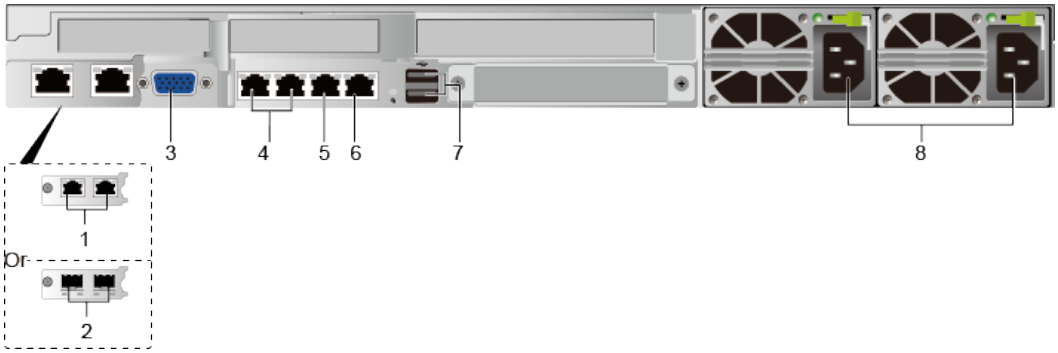
Table 4-2 Description of ports on the front panel

Port	Type	Description
VGA port	DB15	The VGA port is used to connect a terminal, such as a monitor or KVM.
USB port	USB 2.0/USB 3.0	The USB ports allow USB devices to be connected to the server. **NOTE** Before connecting an external USB device, check that the USB device functions properly. A server may operate abnormally if an abnormal USB device is connected.

Rear Panel

Figure 4-7 shows the ports on the rear panel of a server.

Figure 4-7 Rear panel



1	10GE electrical ports	2	10GE optical ports
3	VGA port	4	GE electrical ports
5	Management network port	6	Serial port
7	USB 3.0 ports	8	PSU sockets

Table 4-3 describes the ports on the rear panel.

Table 4-3 Description of ports on the rear panel

Port	Type	Quantity	Description
10GE electrical port	10GBASE-T	2	The mainboard provides two 10GE electrical ports or two 10GE optical ports for you to select.

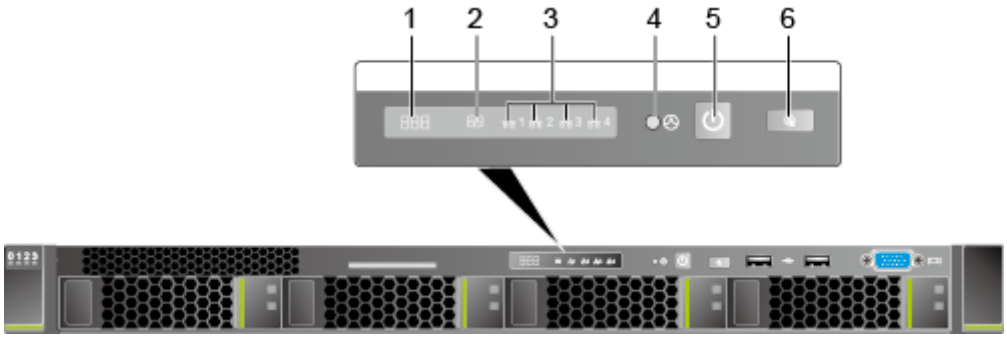
Port	Type	Quantity	Description
10GE optical port	10GE SFP+	2	**NOTE** ● 10GE optical ports do not support 10 Mbit/s or 100 Mbit/s networks. ● 10GE electrical ports do not support 10 Mbit/s or 100 Mbit/s networks and the rate cannot be forcibly set to 1000 Mbit/s.
VGA port	DB15	1	The VGA port is used to connect a terminal, such as a monitor or KVM.
GE electrical port	1000BASE-T	2	Server service network port **NOTE** This port does not support forcible rates or 10 Mbit/s and 100 Mbit/s networks.
Serial port	RJ45	1	The serial port is used as the system serial port by default. You can set it as the iBMC serial port by using the iBMC command. This port is used for debugging.
Management network port	1000BASE-T	1	The 1000 Mbit/s Ethernet port is used for server management.
USB port	USB 3.0	2	The USB ports allow USB devices to be connected to the server. **NOTICE** Before connecting an external USB device, check that the USB device functions properly. A server may operate abnormally if an abnormal USB device is connected.
PSU socket	—	1 or 2	Determine the number of PSUs based on actual requirements, but ensure that the rated power of the PSUs is greater than that of the server. When one PSU is used, **Predicted PSU Status** on the iBMC WebUI cannot be set to **Active/Standby**.

4.3 Indicators and Buttons

Front Panel

- **Figure 4-8** shows the indicators and buttons on the front panel of a server with four 3.5-inch hard disks.

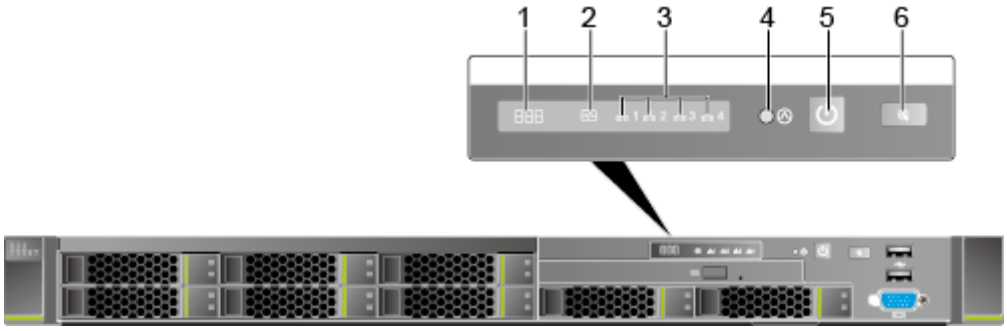
Figure 4-8 Front panel of a server with four 3.5-inch hard disks



1 Fault diagnosis LED	2 Health indicator
3 Network port connection status indicators (1 to 4 from left to right)	4 NMI button
5 Power button/indicator	6 UID button/indicator

- **Figure 4-9** shows the indicators and buttons on the front panel of a server with eight 2.5-inch hard disks.

Figure 4-9 Front panel of a server with eight 2.5-inch hard disks

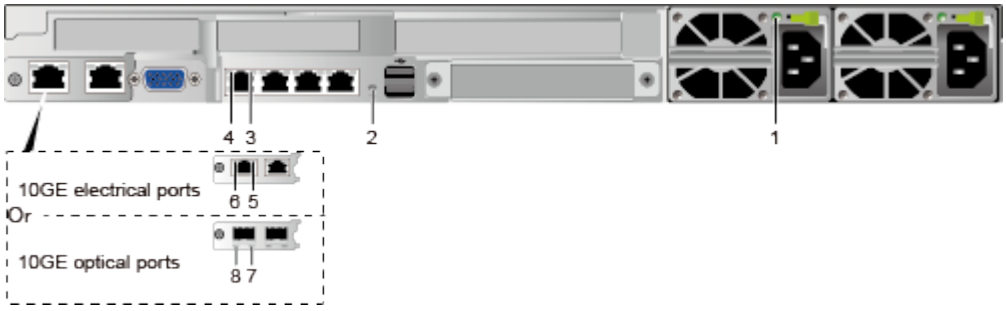


1 Fault diagnosis LED	2 Health indicator
3 Network port connection status indicators (1 to 4 from left to right)	4 NMI button
5 Power button/indicator	6 UID button/indicator

Rear Panel

Figure 4-10 shows the indicators and buttons on the rear panel of a server.

Figure 4-10 Indicators on the rear panel



1 PSU indicator
2 UID indicator
3 Connection status indicator
4 Data transmission status indicator
5 Connection status indicator/Data transmission status indicator
6 Transmission rate indicator
7 Transmission rate indicator
8 Connection status indicator/Data transmission status indicator

Table 4-4 describes the indicators on the rear panel of a server.

Table 4-4 Description of indicators on the rear panel

Indicator		State Description
10GE electrical port	Transmission rate indicator	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is 1 Gbit/s. ● Off: The network port is not connected.
	Connection status indicator/Data transmission status indicator	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.
10GE optical port	Connection status indicator/Data transmission status indicator	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.
	Transmission rate indicator	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is lower than 10 Gbit/s. ● Off: The network port is not connected.
GE electrical port	Connection status indicator	● Steady green: The network port is properly connected. ● Off: The network port is not connected.

Indicator		State Description
	Data transmission status indicator	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.
UID indicator		The UID indicator helps identify and locate a server. You can turn on or off the UID indicator by pressing the UID button or remotely running a command on the iBMC CLI. ● Steady blue/Blinking blue: The server is being located. ● Off: The server is not being located.
PSU indicator		● Steady green: The power input and output are normal. ● Steady orange: The input is normal, but no power output is supplied due to overheat protection, overcurrent protection, short circuit protection, output overvoltage protection, or some component failures. ● Blinking green at 4 Hz: under online upgrade. ● Blinking green at 1 Hz: – The input is normal, the server is standby, and the PSU is in MV6 mode. (The output voltage is 6.7 V.) – The input is overvoltage or undervoltage. – The PSU is in deep hibernation mode. ● Off: No AC power is supplied.

SAS/SATA Hard Disk Indicators

Figure 4-11 shows the SAS/SATA hard disk indicators.

Figure 4-11 SAS/SATA hard disk indicators

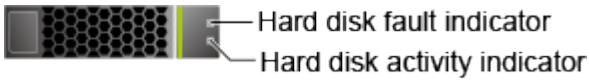


Table 4-5 describes the SAS/SATA hard disk indicators.

Table 4-5 Description of SAS/SATA hard disk indicators

Indicator	State Description
Hard disk fault indicator	● Steady yellow: The hard disk is faulty or the status of a member disk in a RAID array is abnormal. ● Blinking yellow: The server is locating the hard disk or rebuilding RAID. ● Off: The hard disk is operating normally.
Hard disk activity indicator	● Steady green: The hard disk is inactive. ● Blinking green: Data is being read from or written to the hard disk, or synchronized between hard disks. ● Off: The hard disk is faulty or not detected.

Flexible NIC Indicators

Supported flexible NICs include:

- SM211 with two GE electrical ports
- SM210/SM212 with four GE electrical ports
- SM233 with two 10GE electrical ports

Use the **Huawei Server Compatibility Checker** to obtain the details about the flexible NICs.

The following figures show the indicators on these flexible NICs.

Figure 4-12 SM211 with two GE electrical ports

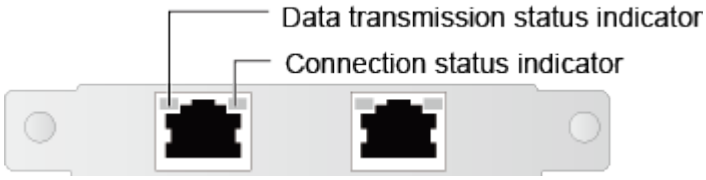


Figure 4-13 SM210/SM212 with four GE electrical ports

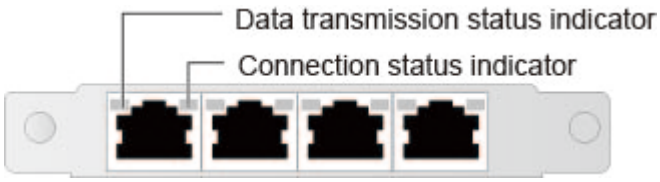


Figure 4-14 SM233 with two 10GE electrical ports

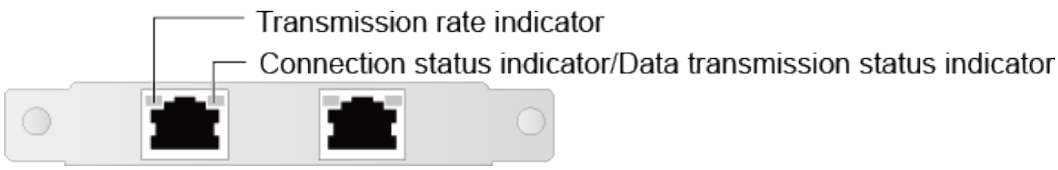


Table 4-6 Description of flexible NIC indicators

NIC Type	Indicator	State Description
● Flexible NIC with two GE electrical ports ● Flexible NIC with four GE electrical ports	Data transmission status indicator	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.
	Connection status indicator	● Steady green: The network port is properly connected. ● Off: The network port is not connected.
Flexible NIC with two 10GE electrical ports	Transmission rate indicator	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is 1 Gbit/s. ● Off: The data transmission rate is 10/100 Mbit/s.
	Connection status indicator/Data transmission status indicator	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: No data is being transmitted or the network port is not connected.

4.4 Riser Cards and PCIe Slots

Figure 4-15 shows the riser card supported by the server.

Figure 4-15 Riser card

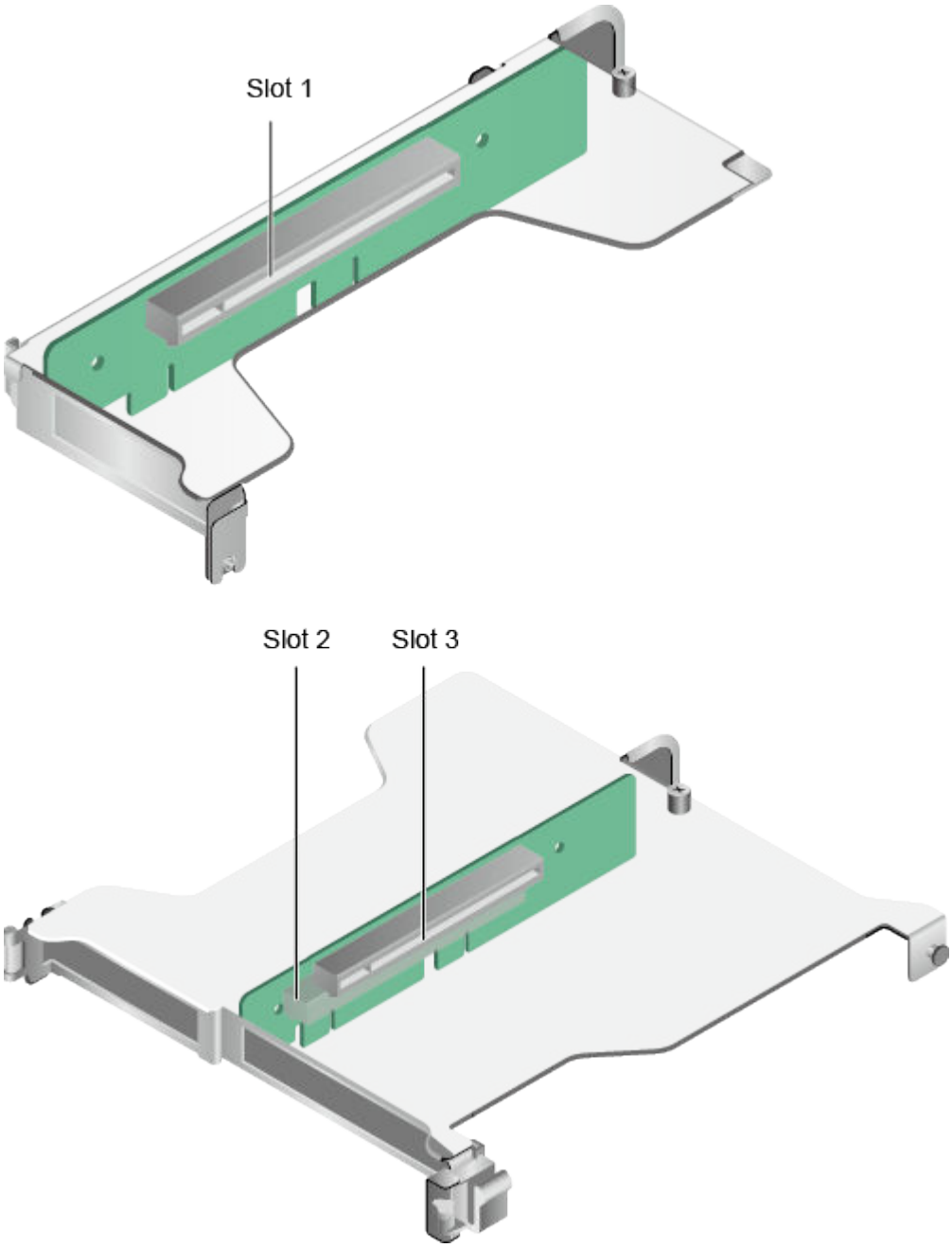


Figure 4-16 shows the PCIe slots on the rear panel.

Figure 4-16 PCIe slots

PCIe riser module (PRM) 1 provides slot 1 and PRM 2 provides slots 2 and 3.

Table 4-7 describes the PCIe slots.

NOTE

If CPU 2 is not installed, the PCIe slots provided by PRM 2 and the flexible NIC are unavailable.

Table 4-7 PCIe slot description

PCIe Device	CPU	PCIe Standard	Connector Bandwidth	Bus Bandwidth	Port Number	ROOT PORT (B/D/F)	Device (B/D/F)	Slot Size
Slot 1	CPU 1	PCIe 3.0	x16	x16	Port 2A	3A/00/0	3B/00/0	Half-height half-length
Slot 2	CPU 2	PCIe 3.0	x16	x16	Port 1A	85/00/0	86/00/0	Half-height half-length
Slot 3	CPU 2	PCIe 3.0	x16	x8	Port 2C	AE/02/0	B2/00/0	Full-height half-length
RAID controller card	CPU 1	PCIe 3.0	x8	x8	Port 1C	17/02/0	1D/00/0	—
Flexible NIC	CPU 2	PCIe 3.0	x8	x8	Port2A	AE/00/0	AF/00/0	—

NOTE

- B/D/F, Bus/Device/Function Number.
- **ROOT PORT (B/D/F)** indicates the bus number of a CPU internal PCIe root port. **Device (B/D/F)** indicates the bus number (displayed on the OS) of an LOM or external PCIe port.
- The PCIe slots that support full-height half-length PCIe cards are backwards compatible with half-height half-length PCIe cards.
- The PCIe slots that support PCIe x16 cards are backwards compatible with PCIe x8, PCIe x4, and PCIe x1 cards.
- Table 4-7 lists the default values of **B/D/F**. If CPUs are not in full configuration or a PCIe card with a PCI bridge is configured, the values of **B/D/F** may differ.

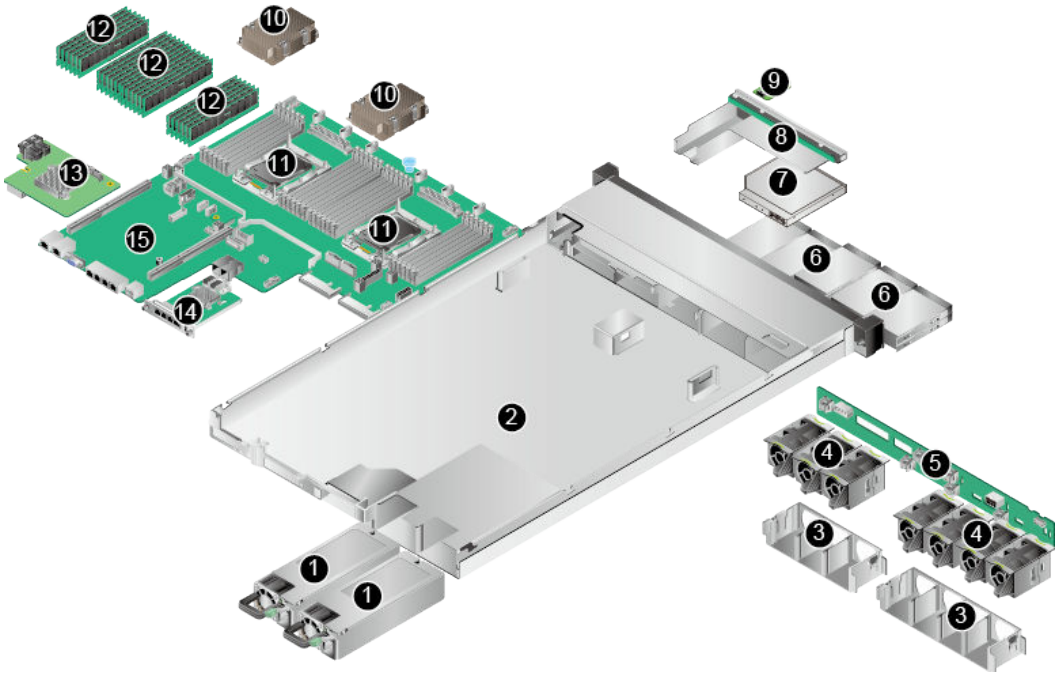
PCIe GPU Configuration Rules

The server supports a maximum of two half-height half-length PCIe x 16 GPUs, which can be installed in slots 1 and 2.

4.5 Physical Structure

Figure 4-17 shows the components of a server.

Figure 4-17 1288H V5 components



1	Power supply unit (PSU)	2	Chassis
3	Fan module bracket	4	Fan module
5	Front hard disk backplane	6	Hard disk
7	DVD-RW drive	8	Indicator board
9	VGA board	10	Heat sink
11	CPU	12	DIMM
13	RAID controller card	14	Flexible NIC
15	Mainboard	—	—

5 Product Specifications

5.1 Technical Specifications

Table 5-1 Technical specifications

Item	Specifications
Form factor	1U rack server
CPU	One or two Intel® Xeon® Scalable 3100, 4100, 5100, 6100, and 8100 processors ● A maximum of 28 cores (2.5 GHz) ● Maximum frequency: 3.6 GHz (four cores) ● Two UPI links: 10.4 GT/s maximum transmission speed per link ● Maximum L3 cache capacity per core: 1.375 MB ● Maximum thermal design power (TDP): 205 W
Chipset	Intel C622

Item	Specifications
Memory	● Supports a maximum of 24 DDR4 RDIMMs or LRDIMMs. ● RDIMM: twenty-four 32 GB RDIMMs for two CPUs, with a maximum memory capacity of 768 GB ● LRDIMM: twenty-four 64 GB LRDIMMs for two CPUs, with a maximum memory capacity of 1536 GB ● Maximum memory speed: 2666 MT/s ● Memory protection: Error Checking and Correcting (ECC), Mirrored Channel Mode, Single Device Data Correction (SDDC), Rank Sparing Mode, and Lockstep **NOTE** DIMMs of different types (RDIMMs and LRDIMMs) and specifications (such as the capacity, bit width, rank, and height) cannot be installed on one server. The DIMMs on one server must have the same BOM number. For details about BOM numbers, see the **Huawei Server Compatibility Checker**.
Storage	● The server supports various hard disk configurations. For details, see **Table 6-5**. ● Supports hard disk hot swap. ● Supports RAID 0, 1, 10, 1E, 5, 50, 6, and 60, provides a supercapacitor to protect cache data from power failures, and supports RAID state migration, RAID configuration memory, self-diagnosis, and web-based configuration. **NOTE** If the BIOS is in Legacy mode, the server does not support a 4K hard disk as the system boot disk.
Network port	● Two 10GE electrical or optical LOM ports (provided by the PCH), supporting NC-SI, WOL, and PXE ● Two GE electrical LOM ports (provided by the PCH), supporting NC-SI, WOL, and PXE ● Network ports provided by the flexible NIC: – Two GE electrical ports, supporting NC-SI, WOL, and PXE – Four GE electrical ports, supporting NC-SI, WOL, and PXE – Two 10GE electrical ports, supporting NC-SI, WOL, and PXE **NOTE** If a server is forcibly powered off, the NC-SI function of LOM ports will be unavailable and you need to refresh the iBMC WebUI to restore the function. The WOL function will also be unavailable.

Item	Specifications
RAID controller card	The RAID controller card does not occupy a standard PCIe slot, which improves system scalability. The RAID controller card supports RAID level migration and RAID configuration memory. The server supports the following RAID controller cards: ● LSI SAS3008 (SR130): supports RAID 0, 1, 10, and 1E, and does not support out-of-band iBMC management. ● LSI SAS3008 (SR130-M): supports the IT mode and iBMC out-of-band management, but does not support RAID arrays. ● LSI SAS3108 (SR430C-M): supports RAID 0, 1, 10, 5, 50, 6, and 60, supports a supercapacitor for power-off protection, and supports iBMC out-of-band management. ● Broadcom SAS3508 (SR450C-M 2G/4G): supports RAID 0, 1, 10, 5, 50, 6, and 60, a supercapacitor for power-off protection, and out-of-band iBMC management. ● Broadcom SAS3408 (SR150-M): supports RAID 0, 1, and 10, and out-of-band iBMC management, but does not support power failure protection.
PCIe slot	● The server provides five PCIe 3.0 slots, among which one is a dedicated PCIe slot for a RAID controller card, one is a dedicated PCIe slot for a flexible NIC, and the other three are standard PCIe slots. The specifications of the three standard PCIe slots are as follows: – PRM 1 provides one standard half-height half-length PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x16). – PRM 2 provides one standard half-height half-length PCIe 3.0 x16 slots (bandwidth: PCIe 3.0 x16) and one standard full-height half-length PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8). ● One Huawei SSD card, which greatly improves I/O performance for search, cache, and download services ● One P4 GPU **NOTE** Use the **Huawei Server Compatibility Checker** to check the PCIe cards supported by the server. For PCIe cards not listed in the **Huawei Server Compatibility Checker**, contact your local Huawei sales representative or Huawei technical support.

Item	Specifications
Port	● One USB 2.0 ports, one USB 3.0 port, and one DB15 VGA port on the front panel ● Two USB 3.0 ports, one DB15 VGA port, one RJ45 serial port, one system management port, two GE electrical ports, and two 10GE electrical ports or two 10GE optical ports on the rear panel ● One built-in USB 3.0 port and two built-in SATA ports **NOTE** ● The front USB 3.0 ports are connected to the built-in USB 3.0 port through a USB signal cable. Otherwise, the built-in USB 3.0 port is unavailable. ● The built-in USB port cannot be used for installing OSs.
Fan module	Seven hot-swappable fan modules, allowing one-fan failures **NOTE** The fans on one server must have the same BOM number.
System management	● UEFI ● iBMC Uses an independent port. Supports Simple Network Management Protocol (SNMP) v1/v2c/v3, IPMI 2.0, and Redfish 1.0, and provides the GUI, virtual KVM, virtual media, Serial Over LAN (SOL), intelligent power supply, remote control, hardware and monitoring features. ● NC-SI ● Supports Huawei eSight management software and integration with third-party management systems, such as VMware vCenter, Microsoft SystemCenter, and Nagios.
Security	● Power-on password ● Administrator password ● Front bezel
Video card	Integrates an SM750 graphics card chip to the mainboard to provide a memory capacity of 32 MB and support a maximum resolution of 1600 x 1200 at 60 Hz with 16 M colors. **NOTE** The resolution 1600 x 1200 is supported only when the Windows Server 2012 R2 driver is installed.

5.2 Physical and Environmental Specifications

Physical Specifications

Table 5-2 Physical specifications

Item	Specifications
Dimensions (H x W x D)	● Chassis with 3.5-inch hard disks: 43 mm x 436 mm x 748 mm (1.69 in. x 17.17 in. x 29.45 in.) ● Chassis with 2.5-inch hard disks: 43 mm x 436 mm x 708 mm (1.69 in. x 17.17 in. x 27.87 in.)
Installation space	The server fits into a universal cabinet that complies with the IEC 297 standard. ● Cabinet width: 19 in. ● Cabinet depth: > 1000 mm (39.37 in.) Requirements for guide rail installation: ● L-shaped guide rails: apply only to a Huawei cabinet. ● Adjustable guide rails: apply to a cabinet with a distance of 543.5 mm to 848.5 mm (21.40 in. to 33.41 in.) between the front and rear mounting bars. ● Holding rails: apply to a cabinet with a distance of 610 mm to 914 mm (24.02 in. to 35.98 in.) between the front and rear mounting bars.
Weight in full configuration	Net weight: ● With eight 2.5-inch hard disks: 17.3 kg (38.15 lb) ● With four 3.5-inch hard disks: 18.4 kg (40.57 lb) Packaging materials: 5 kg (11.03 lb)
Power consumption	The power consumption varies with the server configuration. Use the **Huawei Server Power Calculator** to calculate the power consumption.

Item	Specifications
Acoustic noise	The data listed in the following is the declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) when the server is operating in a 23°C (73.4°F) ambient environment. Noise emissions are measured in accordance with ISO 7999 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). ● Idle: – LWAd: 5.92 Bels – LpAm: 42.3 dBA ● Operating: – LWAd: 6.14 Bels – LpAm: 46.3 dBA **NOTE** The actual sound levels generated when the server is operating vary depending on the server configuration, workload, and ambient temperature.

Environmental Specifications

- **Temperature**
  - Operating temperature: 5°C to 45°C (41°F to 113°F) (meeting the ASHRAE CLASS A3 and A4 standards). For details, see **Table 5-3**.
  - Storage temperature: -40°C to +65°C (-40°F to +149°F).
  - Temperature change rate: < 20°C/h (36°F/h).

Table 5-3 Operating temperature specifications

Model	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F) (ASHRAE CLASS A3 Compliant)	Maximum Operating Temperature 45°C (113°F) (ASHRAE CLASS A4 Compliant)
Server with eight 2.5-inch hard disks	Supports all configurations.	● Does not support PCIe SSD cards. ● Does not support passive cooling GPUs. ● Does not support Intel® Xeon® Platinum	● Does not support PCIe SSD cards. ● Does not support passive cooling GPUs. ● Supports only Intel® Xeon® Platinum 8153 and Gold

Model	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F) (ASHRAE CLASS A3 Compliant)	Maximum Operating Temperature 45°C (113°F) (ASHRAE CLASS A4 Compliant)
Server with four 3.5-inch hard disks		8180/8168 and Gold 6154 CPUs.	6152/6140/6126/5118 CPUs, and CPUs lower than 105 W.

NOTE

- If one fan fails, the highest operating temperature of the server is 5°C (9°F) lower than that in normal cases.
- When GPUs are used, the failure of one fan may result in performance deterioration.

- **Humidity**
  - Operating humidity: 8% RH to 90% RH (non-condensing)
  - Storage humidity: 5% to 95% RH(non-condensing)
  - Humidity change rate: < 20% RH/h
- **Altitude**
  - ≤ 3048 m (9999.88 ft). For altitudes above 900 m (2952.72 ft), the operating temperature decreases by 1°C (1.8°F) every 300 m (984.24 ft).
  - HDDs are not supported when the altitude is higher than 3000 m (9842.4 ft).
- **Corrosive gaseous contaminant**
  - Copper corrosion rate test requirements: The corrosion product thickness growth rate is lower than 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion).
  - Silver corrosion rate test requirements: The corrosion product thickness growth rate is lower than 200 Å/month.
- **Particle contaminant**
  - The equipment room environment meets the requirements of ISO 14664-1 Class 8.

    You are advised to hire a professional organization to monitor particle contaminants in the equipment room.
  - The equipment room is free from explosive, conductive, magnetic conductive, and corrosive dust.

6 Component Compatibility

Use the **Huawei Server Compatibility Checker** to check the software and hardware supported by the server.

6.1 CPU

One or two Intel® Xeon® Scalable 3100, 4100, 5100, 6100, and 8100 processors

- A maximum of 28 cores (2.5 GHz)
- Maximum frequency: 3.6 GHz (four cores)
- Two UPI links: 10.4 GT/s maximum transmission speed per link
- Maximum L3 cache capacity per core: 1.375 MB
- Maximum thermal design power (TDP): 205 W

NOTE

- For details about component options, consult the local Huawei sales representatives.
- CPUs on the same server must be of the same model.
- For details about CPUs, visit **https://www.intel.com/content/www/us/en/homepage.html**.

6.2 Memory

Memory Configuration Rules

A server provides 24 DDR4 DIMM slots. Each processor supports six memory channels and each memory channel supports two DDR4 DIMMs.

Observe the following rules when configuring DIMMs:

1. DIMMs of different types (RDIMMs and LRDIMMs) cannot be installed on one server.
2. Each channel supports a maximum of eight ranks.

   NOTE

   A channel supports more than eight ranks for LRDIMMs, because a quad-rank LRDIMM generates the same electrical load as a single-rank RDIMM on a memory bus.
3. The maximum number of DIMMs to be installed on the server varies with the processor type, DIMM type, number of ranks, and operating voltage. For details, see **Maximum number of DIMMs** in the following tables.

   NOTE

   Restriction of the number of ranks supported by each channel on the maximum number of DIMMs supported by each channel:

   Number of DIMMs supported by each channel ≤ Number of ranks supported by each memory channel/Number of ranks supported by each DIMM
4. All DIMMs operate at the same speed, which is the smaller value of:
   - Memory speed supported by a CPU
   - Lowest maximum operating speed for the selected memory configuration. For details, see **Maximum operating speed** in the following tables.

Table 6-1 RDIMM configuration

Item		Specifications
Rank		Dual rank
Rated speed (MT/s)		2666
Operating voltage (V)		1.2
Maximum number of DIMMs		24
Maximum capacity per DIMM (GB)		32
Maximum total memory capacity (GB)		768
Maximum total memory capacity at maximum operating speed (GB)		768
Maximum operating speed (MT/s)	One DIMM per channel	2666
	Two DIMMs per channel	2666
Note 1: The maximum number of DIMMs listed in this table is based on dual-processor configuration. These values are halved for a server with only one processor.		

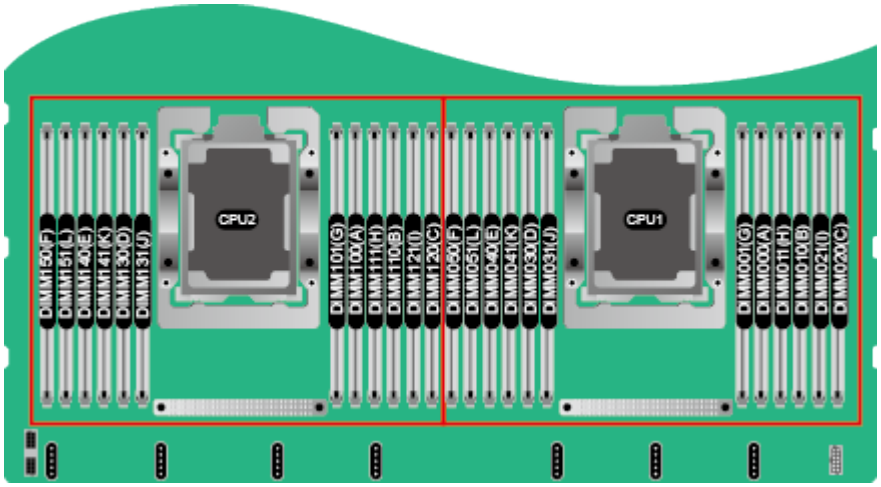
Table 6-2 LRDIMM configuration

Item		Specifications
Rank		Quad rank
Rated speed (MT/s)		2666
Operating voltage (V)		1.2
Maximum number of DIMMs		24
Maximum capacity per DIMM (GB)		64
Maximum total memory capacity (GB)		1536
Maximum total memory capacity at maximum operating speed (GB)		1536
Maximum operating speed (MT/s)	One DIMM per channel	2666
	Two DIMMs per channel	2666
Note 1: The maximum number of DIMMs listed in this table is based on dual-processor configuration. These values are halved for a server with only one processor.		

Memory Slot Configuration Rules

Figure 6-1 shows the DIMM slot numbers and positions.

Figure 6-1 DIMM slots



- The server supports DIMMs of 16 GB, 32 GB, and 64 GB. A server fully configured with DIMMs has up to 1536 GB of memory.
- The server provides 24 DDR4 DIMM slots. Each CPU supports six channels. Table 6-3 lists channels for each CPU.

Table 6-3 Channels

CPU	Channel	DIMM
CPU 1	A	DIMM000(A)
		DIMM001(G)
	B	DIMM010(B)
		DIMM011(H)
	C	DIMM020(C)
		DIMM021(I)
	D	DIMM030(D)
		DIMM031(J)
	E	DIMM040(E)
		DIMM041(K)
	F	DIMM050(F)
		DIMM051(L)
CPU 2	A	DIMM100(A)
		DIMM101(G)
	B	DIMM110(B)
		DIMM111(H)
	C	DIMM120(C)
		DIMM121(I)
	D	DIMM130(D)
		DIMM131(J)
	E	DIMM140(E)
		DIMM141(K)
	F	DIMM150(F)
		DIMM151(L)

Table 6-4 lists the order of installing DIMMs.

Table 6-4 Installation order

CPU	DIMM Installation Order
CPU 1	000(A), 010(B), 020(C), 030(D), 040(E), 050(F), 001(G), 011(H), 021(I), 031(J), 041(K), 051(L)
CPU 1 and CPU 2	000(A), 100(A), 010(B), 110(B), 020(C), 120(C), 030(D), 130(D), 040(E), 140(E), 050(F), 150(F), 001(G), 101(G), 011(H), 111(H), 021(I), 121(I), 031(J), 131(J), 041(K), 141(K), 051(L), 151(L)

Memory Protection Technologies

The server supports the following memory protection technologies:

- ECC
- Mirrored Channel Mode
- SDDC
- Rank Sparing Mode
- Lockstep

Supported DIMMs

NOTE

- For details about component options, consult the local Huawei sales representatives.
- DIMMs on one server must have the same BOM number.

6.3 Storage

Table 6-5 lists hard disk configurations supported by the server.

NOTE

The following table is for reference only. For details about component options, consult the local Huawei sales representatives.

Table 6-5 Hard disk configurations

Configuration	Maximum Front Hard Disks	Hard Disk Management Mode
4 x 3.5-inch disks	4 (SAS/SATA hard disk)	One RAID controller card
8 x 2.5-inch disks[1]	8 (SAS/SATA hard disk)	One RAID controller card
[1]: This hard disk configuration supports only 2.5-inch hard disks.		

The following figures show the hard disk slots for these configurations.

- 4 x 3.5-inch disks

Figure 6-2 4 x 3.5-inch disks

- 8 x 2.5-inch disks

Figure 6-3 8 x 2.5-inch disks

Table 6-6 lists the comparison between RAID levels in performance and disk usage.

Table 6-6 RAID level comparison

RAID Level	Reliability	Read Performance	Write Performance	Hard Disk Usage
RAID 0	Low	High	High	100%
RAID 1	High	High	Low	50%
RAID 5	Relatively high	High	Medium	(N - 1)/N
RAID 6	Relatively high	High	Medium	(N - 2)/N
RAID 10	High	High	Medium	50%
RAID 1E	High	Medium	Medium	50%
RAID 50	High	High	Relatively high	(N - M)/N
RAID 60	High	High	Relatively high	(N - M x 2)/N
Note: N indicates the number of member disks in a RAID group, and M indicates the number of subgroups in a RAID group.				

6.4 I/O Expansion

The server supports a wide range of PCIe cards for you to choose based on the card type and transmission speed:

- Fiber Channel (FC) host bus adapter (HBA)
- Converged network adapter (CNA)
- Network expansion card
- SSD card

NOTE

For details about component options, consult the local Huawei sales representatives.

6.5 PSU

Table 6-7 lists the PSU supported by the server.

Table 6-7 Supported PSU

PSU Model	Rated Power	Rated Input Voltage
550 W AC Platinum PSU	550 W	● AC: 100 V to 240 V ● HVDC: 192 V to 288V
1500W AC Platinum PSU	1500 W	● AC: 100 V to 240 V ● HVDC: 192 V to 288 V
900W AC Platinum PSU	900 W	● AC: 100 V to 240 V ● HVDC: 192 V to 288 V

NOTE

- The PSUs are hot-swappable and work in 1+1 redundancy mode.
- Table 6-7 is for reference only. For details about component options, see the **Huawei Server Compatibility Checker**.
- PSUs on one server must have the same BOM number.
- The PSUs provide short-circuit protection. The PSUs that support dual input live wires provide double-pole fuse.
- If the input voltage ranges from 100 V to 132 V AC, the output power of the 1500 W AC platinum PSU decreases to 1000 W, and the 550 W AC platinum PSU is not affected.
- The power of a 1500 W AC platinum PSU can reach 1700 W. When two such PSUs are installed, they can be used as 1700 W PSUs.

6.6 OS and Software Support

For details about component options, see the **Huawei Server Compatibility Checker**.

7 System Management

The server uses Huawei's proprietary intelligent baseboard management controller (iBMC) for remote server management. The iBMC complies with Intelligent Platform Management Interface (IPMI) 2.0 and provides highly reliable hardware monitoring and management.

The iBMC supports the following features and protocols:

- KVM and text console redirection
- Remote virtual media
- IPMI
- Simple Network Management Protocol (SNMP)
- Redfish 1.0
- Login using a web browser

Table 7-1 describes the features of the iBMC.

Table 7-1 iBMC features

Feature	Description
Management interface	Integrates with any standard management system through the following interfaces: ● IPMI ● CLI ● HTTPS ● SNMP ● Redfish
Fault detection	Detects faults and accurately locates faults in hardware, for example, an FRU.
Alarm management	Supports alarm management and reports alarms using the SNMP trap, Simple Mail Transfer Protocol (SMTP), and syslog service to ensure 24/7 continuous operation.
Integrated virtual KVM	Provides remote maintenance measures for troubleshooting.

Feature	Description
Integrated virtual media	Virtualizes local media devices, images, USB keys, and folders into media devices on a remote server, simplifying OS installation. (The virtual DVD-ROM drive supports a maximum transmission rate of 8 MB/s.)
WebUI	Provides a user-friendly graphical user interface (GUI), which simplifies users' configuration and query operations.
Fault reproduction	Reproduces faults to facilitate fault diagnosis.
Screen snapshots and screen videos	Allows you to view screenshots and videos without login, which facilitates routine preventive maintenance inspection (PMI)
Domain Name Service (DNS)/ Active Directory (AD)	Supports the DNS and AD, significantly simplifying network and configuration management.
Dual-image backup	Starts software from a backup image if the software fails.
Asset management	Supports intelligent asset management.
Intelligent power management	Uses the power capping technology to increase deployment density, and uses dynamic energy saving to lower operating expenses.
IPv6	Supports IPv6 to ensure sufficient IP addresses.
Network Controller Sideband Interface (NC-SI)	Supports NC-SI, which allows you to access the iBMC through the service network port.

8 Warranty

According to the *Huawei Warranty Policy for Servers & Storage Products* (*Warranty Policy* for short), Huawei provides a three-year warranty for the server, a one-year warranty for DVD-RW drives and batteries, and a three-month warranty for software media. The *Warranty Policy* stipulates warranty terms and conditions, including the available services, response time, terms of service, and disclaimer.

The warranty terms and conditions may vary by country, and some services and/or parts may not be available in all countries. and some services and/or parts may not be available in all countries. For more information about warranty services in your country, contact Huawei technical support or the local Huawei representative office.

Table 8-1 describes the warranty service response time.

Table 8-1 Response time

Service	Response Time	Description	Remarks
Help Desk	24/7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Remote troubleshooting	24/7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	The response time is the period between the end of a customer's service request and beginning of the response by the technical support to offer troubleshooting services.

Service	Response Time		Description	Remarks
Online technical support	24/7		Huawei enterprise support website (http://e.huawei.com): available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Licensing of software updates	24/7		Available 9 hours a day, 5 days a week (09:00 to 18:00, Monday to Friday), excluding official holidays.	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
Return for repair	Outside China	9/5 hours, shipment within 45 calendar days	Available 9 hours a day, 5 days a week (09:00 to 18:00, Monday to Friday), excluding official holidays.	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
	In China	10/5 hours, next business day	Available 10 hours a day, 5 days a week (08:00 to 18:00, Monday to Friday), excluding official holidays. Arrival: NBD	1. Service requests submitted after 15:30 will be handled the next business day. 2. The response time starts when a remote decision is made to appoint an onsite engineer.

Table 8-2 describes warranty services provided by Huawei.

Table 8-2 Warranty services

Service	Description
Help Desk	Huawei provides 24-hour after-sales technical support (such as handling requests for troubleshooting and hardware repair), receives and handles customer inquiries, complaints, and suggestions through a dedicated hotline.
Remote troubleshooting	After receiving a service request for rectifying a network or system fault, Huawei engineers will analyze and handle the fault remotely and proceed to rectify it in the shortest possible time. There are two methods for remote troubleshooting: telephone support and remote access.
Online technical support	Huawei enterprise support website (http://e.huawei.com) provides product and technical materials, such as product manuals, configuration guides, networking case study, and maintenance experience collections. Registered users can access the website and download required documents.
Licensing of software updates	To ensure that the devices operate stably, Huawei provides software patches whenever necessary
Return for repair	Huawei provides repair or replacement services for customers within the promised time to meet customer needs for spare parts. You can return defective parts to the designated Huawei site after submitting a service request. Huawei provides a three-year warranty for parts replacement and limited onsite repair for the servers used in China. Huawei provides a 10-hour-a-day, 5-day-a-week NBD support program. Huawei provides a three-year warranty for parts replacement and repair for the servers used outside China. Huawei provides a 9-hour-a-day, 5-day-a-week NBD support program. Service requests will be handled the next business day. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

9 Certifications

Country/ Region	Certification	Standards
Europe	WEEE	2002/96/EC，2012/19/EU
Europe	RoHS	2002/95/EC，2011/65/EU， EN 50581: 2012
Europe	REACH	EC NO. 1907/2006
Europe	CE	Safety: EN 60950-1:2006+A11:2009+A1:2010+A12:2011 EMC: ● EN 55022:2010 ● CISPR 22:2008 ● EN 55024:2010 ● CISPR 24:2010 ● ETSI EN 300 386 V1.6.1:2012 ● ETSI ES 201 468 V1.3.1:2005
China	CCC	GB4943.1-2011 GB9254-2008(Class A) GB17625.1-2012
China	RoHS	SJ/T-11363－20006 SJ/T-11364－20006 GB/T 26572－2011
Australia	C-tick	AS/NZS CISPR22: 2009
America	FCC	FCC Part 15 (Class A)

Country/ Region	Certification	Standards
America	NTRL-UL	UL 60950-1，2nd Edition，2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No.60950-1-07，2nd Edition，2011-12 (Information Technology Equipment-Safety-Part 1:General Requirements)
Canada	IC	ICES-003 Class A
Canada	NRTL-UL	UL 60950-1,2nd Edition,2011-12-19 (Information Technology Equipment-Safety-Part 1：General Requirements)
Nigeria	SONCAP	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
Kingdom of Saudi Arabia (KSA)	SASO	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
Global	CB	IEC 60950-1
Japan	VCCI	VCCI V-4:2012
Saudi, Nigeria, Tanzania, Uganda, Kuwait, Algeria, Botswana, Qatar, Egypt	Multi-country_certificate	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011

10 References

For more information about the product, see the following documents:

- **Server Data Sheet**
- **Server-related Documentation**
- **Huawei Server Information Self-Service Platform**